Claims

1. A screw (1) comprising a threaded shank (2) with a force application location (4) for transmitting torque and a screw tip (6), the threaded shank (2) being composed of a shank core (10) and an automatically thread-forming thread (12), and the thread (12) being formed as an elevation which extends helically over the shank core (10), is delimited by two flanks (15, 16) which converge in an outer thread edge (14) and has a height (H) measured radially from the shank core (10) to the thread edge (14), the thread (12) having, seen in profile, at the thread edge (14) a specific apex angle (α) formed between the adjacent flanks (15, 16), characterized in that at least one of the two flanks (15, 16) of the thread (12) is formed concavely in the region between the shank core (10) and the thread edge (14), seen in radial profile, in such a way that the apex angle (α) is less than a flank angle (α_F) enclosed between imaginary straight flank lines (FG) determined in each case by a lowest point (GF) of the thread and the thread edge (14).

2. The screw as claimed in claim 1, characterized in that both flanks (15, 16) are concavely formed - preferably in the same manner.

3. The screw as claimed in claim 1 or 2, characterized in that the/each flank (15, 16) extends concavely, at least over part of the radial height (H), from the shank core (10).

4. The screw as claimed in claim 1 or 2, characterized in that the/each flank (15, 16) extends initially in a straight line from the shank core 10, corresponding to the straight flank line (FG), and

only extends concavely from a specific flank height (h_F).

5. The screw as claimed in one of claims 1 to 4, characterized in that the flanks (15, 16) extend substantially in a straight line in an outer partial region adjoining the thread edge (14), seen in profile.

6. The screw as claimed in one of claims 1 to 5, characterized in that the apex angle (α) lies approximately in the range from 25° to 35°.

7. The screw as claimed in one of claims 1 to 6, characterized in that, at least in a partial region of the thread (12), the outer thread edge (14) extends in a wave form in the radial direction with an amplitude (U) between wave crests (20) with the thread height (H) and wave troughs (22) with a height (h) reduced by the amplitude (U), and the thread (12) has, at least in the region of one of its flanks (15/16), in the region of the wave troughs (22) of the thread edge (14) indentations (24), which interrupt the surface of the flank (15/16) and the outer delimitation of which is the thread edge (14), the thread (12) respectively having in the regions of the wave crests (20) of the thread edge (14) that are not interrupted by indentations (24) the specific, first apex angle (α), formed between the flanks (15/16), and a second apex angle (α'), in the lowest region of the wave troughs (22) of the thread edge (14).

8. The screw as claimed in claim 7, characterized in that the indentations (24) have surfaces extending substantially in a straight line, seen in the radial direction, in the profile of the thread (12), the second apex angle (α') being greater than the first apex angle (α) and lying in particular

approximately in the range from 30° to a maximum of 58°.

9. The screw as claimed in claim 7, characterized in that the indentations (24) have, seen in profile, concave surfaces, at least in certain portions, the second apex angle (α') being of approximately the same order of magnitude as the first apex angle (α).

10. The screw as claimed in particular in one of claims 7 to 9, characterized in that, for use for screwing into softer materials, such as wood or wood-like materials, the amplitude (U) of the waved thread edge (14) is approximately 0.2 to 0.4 times the thread height (H).

11. The screw as claimed in particular in one of claims 7 to 9, characterized in that, for use for screwing into harder or more resistant materials, in particular plastics or metals, the amplitude (U) of the waved thread edge (14) is approximately 0.05 to 0.15 times the thread height (H).

12. The screw as claimed in particular in one of claims 7 to 9, characterized in that, for universal use for screwing into various materials, the amplitude (U) of the waved thread edge (14) is approximately 0.1 to 0.3 times the thread height (H).

13. The screw as claimed in particular in one of claims 7 to 12, characterized in that the indentations (24) have in each case a depth (Z), which is measured inward in the radial direction from a diameter (D) determined by the wave crests (20) of the thread edge (14) and is less than/equal to the height (H) of the thread (12).

14. The screw as claimed in claim 13, characterized in that, for use for screwing into softer materials, such as wood or wood-like materials, the radial depth (Z) of the indentations (24) is approximately 0.8 to 1 times the thread height (H).

15. The screw as claimed in claim 13, characterized in that, for use for screwing into harder or more resistant materials, in particular plastics or metals, the radial depth (Z) of the indentations (24) is approximately 0.2 to 0.3 times the thread height (H).

16. The screw as claimed in claim 13, characterized in that, for universal use for screwing into various materials, the radial depth (Z) of the indentations (24) is approximately 0.3 to 0.8 times the thread height (H).

17. The screw as claimed in particular in one of claims 7 to 16, characterized in that the wave crests (20) are spaced apart from one another in the circumferential direction in each case by a pitch angle (δ), which, for use for screwing into softer materials, such as wood or wood-like materials, lies in the range from 30° to 45°.

18. The screw as claimed in particular in one of claims 7 to 16, characterized in that the wave crests (20) are spaced apart from one another in the circumferential direction in each case by a pitch angle (δ), which, for use for screwing into harder or more resistant materials, in particular plastics or metals, lies in the range from 15° to 24°.

19. The screw as claimed in particular in one of claims 7 to 16, characterized in that the wave crests (20) are spaced apart from one another in the circumferential direction in each case by a pitch

angle (δ), which, for use for screwing into various materials, lies in the range from 20° to 35°.

20. The screw as claimed in particular in one of claims 7 to 19, characterized in that the indentations (24) are in each case delimited from the adjacent face of the flank (15, 16) by a limiting line (26), the limiting line (26) having substantially the form of a parabola with lateral, approximately V-shaped limiting portions (28), a thread portion (30) that is uninterrupted with respect to its flanks (15, 16) being respectively formed between two neighboring indentations (24) in the region of the wave crests (20) and the limiting portions (28) that lie on both sides of this thread portion (30) enclosing an angle (γ), which lies in the range from 30° to 90°.

21. The screw as claimed in claim 20, characterized in that the limiting portions (28) merge with one another in the region of each wave crest (20) over a rounding with a radius (r), which corresponds approximately to 0.1 to 0.3 times the thread height (H).

22. The screw as claimed in claim 20 or 21, characterized in that each indentation (24) is symmetrically formed in such a way that its limiting portions (28) extend in each case at the same angle to a radial axis (31) of the indentation (24) in the screwing-in and unscrewing directions (E/A) of the screw.

23. The screw as claimed in claim 20 or 21, characterized in that each indentation (24) is asymmetrically formed in such a way that the front limiting line (28) in the screwing-in direction (E) extends more steeply than the rear limiting line (28), an axis (32) of the indentation (24) being

offset in relation to a radial center line (34) of the wave trough (22) of the thread edge (14) by an acute angle (β) in the screwing-in direction (E), this angle (β) preferably being approximately of the order of magnitude of 10° to 25°.

24. The screw as claimed in one of claims 7 to 23, characterized in that the thread (12) extends up to the pointed end (18) of the screw tip (6), the thread (12) being configured with the indentations (24) and the waved thread edge (14) from the screw tip (6), at least over the first adjoining turn of the thread.

25. The screw as claimed in one of claims 7 to 24, characterized in that the indentations (24) are formed lying opposite one another on both flanks (15, 16) of the thread (12).

26. The screw as claimed in one of claims 7 to 25, characterized in that, in the region of the screw tip (6), the spacing of the indentations (24) becomes smaller toward its end (18).

27. The screw as claimed in particular in one of claims 1 to 26, characterized in that the thread (12), configured as a one-start thread, has a lead (S) which is approximately 0.5 times the outer thread diameter (D).

28. The screw as claimed in one of claims 1 to 27, characterized in that the screw tip (6) is formed with automatically piercing properties.